

providing for mapping values of the multicarrier signal after channel compensation at instants in time used to transmit symbol values.

97. A method of receiving at least one Carrier Interferometry signal including:
providing for selecting a plurality of received carriers within a predetermined bandwidth;
providing for generating at least one pulse waveform from a superposition of the selected carriers; and
providing for estimating at least one information symbol impressed on the at least one of the pulse waveforms.

98. A receiver adapted to receive at least one Carrier Interferometry signal including:
a filter adapted to select a predetermined set of received carriers;
a combiner coupled to the filter, the combiner adapted to combine the received carriers; and
a decision device coupled to the combiner, the decision device adapted to generate at least one estimated data symbol from the combined carriers.

99. A receiver adapted to receive at least one Carrier Interferometry signal including:
a filter adapted to select a predetermined set of received carriers;
a combiner coupled to the filter, the combiner adapted to optimally combine the received carriers in the presence of at least one of interference and multipath; and
a decision device coupled to the combiner, the decision device adapted to generate at least one estimated data symbol from the combined carriers.

100. An apparatus for receiving a frequency division multiplexed signal representing a plurality of symbols and including a plurality carriers, a subset of said plurality of carriers being allocated to at least one user, the apparatus including:
a time to frequency domain transform module adapted to generate a frequency-domain signal from the frequency division multiplexed signal;
a filter adapted to filter at least one carrier from the frequency domain signal other than those included in the subset to thereby generate a filtered frequency-domain signal;
a frequency to time domain transform module adapted to perform a frequency domain to time domain transform operation on the filtered frequency-domain signal to thereby generate a time-domain signal; and
a decision module coupled to the frequency to time domain transform module for mapping received signal values at points in time to estimated symbol values.

101. A multicarrier signal receiver adapted to receive at least one multicarrier signal, the receiver including:
a channel-compensation module adapted to perform a channel compensation operation on the multicarrier signal; and

a decision module adapted to map values of the multicarrier signal after channel compensation at instants in time used to transmit symbol values.

102. A method of generating a multicarrier communication signal transmitted by a communication device, the method including:

- providing a symbol duration having equally spaced time instants;
- allocating a predetermined number of carrier frequencies to the communication device;
- receiving as input data, symbols to be transmitted by the multicarrier communication signal;
- mapping the data symbols to the equally spaced time instants in the symbol duration to generate a discrete signal of mapped symbols; and
- generating a superposition signal by applying a pulse function to the discrete signal, the pulse function operating on the discrete signal such that a frequency response of the superposition signal includes sinusoids having non-zero values at predetermined frequencies and zero values at frequencies other than the predetermined frequencies.

103. A method for generating a multicarrier communication signal having carrier frequencies distributed over a predetermined bandwidth, the method including:

- providing for defining a symbol duration for the multicarrier communication signal;
- providing for defining a plurality of time instants in the symbol duration;
- providing for allocating a set of carrier frequencies from the carrier frequencies distributed over the predetermined bandwidth to a particular communication device;
- providing for receiving as input, data symbols from a data source;
- providing for mapping the data symbols to the time instants to generate a discrete signal in the time domain; and
- providing for generating a superposition signal by applying pulse functions to the discrete signal such that a frequency response of the digital signal sample vector includes sinusoids having non-zero values at allocated carrier frequencies, and zero values at carrier frequencies other than the allocated carrier frequencies.

104. A method of generating Carrier Interferometry signals including:

- providing for selecting a plurality of carriers within a predetermined bandwidth;
- providing for generating at least one pulse waveform from a superposition of the selected carriers;
- providing for accepting at least one information symbol; and
- providing for impressing the at least one information symbol on the at least one pulse waveform.

105. A transmitter adapted to generate Carrier Interferometry signals including:

- a carrier generator adapted to generate a plurality of carriers within a predetermined bandwidth;

a pulse generator coupled to the carrier generator, the pulse generator adapted to produce at least one pulse waveform from a superposition of selected carriers; and

a modulator coupled to the pulse generator, the modulator adapted to accept at least one information symbol and impress the at least one information symbol onto the at least one pulse waveform.

106. A transmitter adapted to generate Carrier Interferometry signals including:

- a pulse generator adapted to produce at least one pulse waveform having a plurality of carrier components; and
- a modulator coupled to the pulse generator, the modulator adapted to accept at least one information symbol and impress the at least one information symbol on the at least one pulse waveform.

107. A communication system adapted to generate a multicarrier signal having carrier frequencies distributed over a predetermined bandwidth, the communication system including:

- a carrier generator adapted to generate an allocated carrier set selected from carrier frequencies distributed over the predetermined bandwidth;
- an interval delay circuit adapted to provide a plurality of information symbols to prescribed time instants in a symbol duration to generate a discrete signal of symbols; and
- a pulse-generation circuit adapted to receive the discrete signal and generate a pulse sequence by applying predetermined pulse functions to the discrete signal, the pulse functions operating on the discrete signal such that values of the pulse sequence at the prescribed time instants are equal to the information symbols, and a frequency response of the pulse sequence includes sinusoids having non-zero values at frequencies within the allocated carrier set and zero values at the remaining frequencies.

108. A communication system adapted to generate a multicarrier signal having allocated carrier frequencies distributed over a predetermined bandwidth, the communication system including:

- an interval delay circuit adapted to receive a plurality of data symbols and map the symbols to a plurality of prescribed time instants in at least one symbol duration to generate a discrete signal of mapped symbols; and
- a pulse generator adapted to receive the discrete signal and generate a pulse train by applying a pulse function to the discrete signal wherein the pulse generator operates on the discrete signal such that a frequency response of the pulse train includes sinusoids having non-zero values at the allocated carrier frequencies, and zero values at frequencies other than the allocated carrier frequencies.

109. A communication system for generating a multicarrier signal having allocated carrier frequencies distributed over a predetermined bandwidth, the communication system including:

an interval delay circuit adapted to receive a plurality of data symbols and map the symbols to a plurality of prescribed time instants in at least one symbol duration to generate a discrete signal of mapped symbols; and

a pulse generator adapted to receive the discrete signal and generate a pulse train by applying a pulse function consisting of a superposition of the allocated carrier frequencies to the discrete signal wherein the pulse function operates on the discrete signal such that values of the pulse train at the prescribed time instants are equal to the mapped symbols.

110. A communication system adapted to generate a multicarrier signal having a set of carrier frequencies distributed over a predetermined bandwidth, the communication system including:

a data source adapted to process a plurality of information symbols to generate a set of data symbols with a predetermined set of phase relationships and amplitude profiles to provide a superposition of the carriers with orthogonality in time; and

a Fourier-transform circuit coupled to the data source, the Fourier-transform circuit adapted to perform an inverse Fourier transform of the data symbols to produce a digital time-domain superposition signal.

111. In a communication system adapted to generate a multicarrier signal having a set of orthogonal carriers distributed over a predetermined bandwidth, the communication system including a modulator adapted to impress a plurality of data symbols onto the carriers, the communication system further including:

a data source coupled to the modulator, the data source adapted to process a plurality of information symbols to generate the data symbols with a predetermined set of phase relationships and amplitude profiles to provide a superposition of the carriers with orthogonality in time.

Very Respectfully,



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